The Examiner has rejected Claims 2-6 under 35 U.S.C. §103(a) as being unpatentable over Petrov et al, U.S. Patent 6,643,419. However, for the reasons detailed below, Applicants believe the Examiner is in error.

In particular, the Examiner is correct in stating that on Page 3, lines 1-7 of Petrov that a method of producing fluorinated epoxides and a method of incorporating a fluoroalcohol functional group into a polymer is disclosed. In addition, the Examiner has stated that the resultant products are taught to having utilities in photoresist.

However, Applicants believe that the Examiner misunderstands the manner of polymerization and the structure of the resultant polymer disclosed in Petrov. Specifically, Petrov discloses a reaction of fluorinated epoxide and an ethylenically unsaturated compound containing substituent X to produce an ethylenically unsaturated comonomer containing the structure $-XCH_2$ C (Rf)(Rf') OH. This reaction is generally described on page 3, lines 13-28. However, the Examiner's attention is drawn to the structure of this ethylenically unsaturated comonomer containing the structure $-XCH_2$ C(Rf)(Rf') OH.

The structure should be as follows:

(ethylenically unsaturated structure) $-XCH_2$ C(Rf)(Rf')OH

since the structure $-XCH_2$ C(Rf)(Rf')OH does not and cannot contain an ethylenically unsaturated structure.

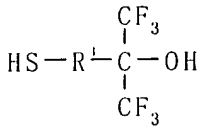
Example 2 is related to this ethylenically unsaturated comonomer containing the structure -XCH_2 C(Rf)(Rf')OH, wherein 1,1-bis(trifluoromethyl) ethylene oxide produced in Example 1 is reacted with 2-hydroxyethylvinyl ether. The resultant product is $CH2=CHOCH_2CH_2OCH_2C(CF_3)_2OH$, and accordingly $CH2=CHOCH_2CH_2$ is ethylenically an unsaturated structure and the remaining $OCH_2C(CF_3)_2OH$ is XCH_2 C(Rf)(Rf')OH. The similar reaction is disclosed in Example 12.

Petrov does not teach the polymerization reaction of the above ethylenically unsaturated comonomer. Assuming that such polymerization reaction proceeds along in the ordinary manner, the resultant polymer should be (polymer derived from the ethylenically unsaturated structure) -XCH_2 C(Rf)(Rf')OH wherein the structure XCH_2 C(Rf)(Rf')OH is incorporated as a pendant group.

In Petrov, Example 13 is related to this polymerization (copolymerization) of ethylenically unsaturated comonomer, wherein hexafluoroisopropanol-substituted norbornene (left side compound, under Example 13) is copolymerized with norbornene (right side compound, under Example 13). The resultant product is a copolymer with a structure indicated over Petrov's Example 14 wherein the strucutre XCH_2 C(Rf)(Rf')OH, $OCH_2C(CH_3)_2OH$ is incorporated as a pendant group into the every recurring units derived from hexafluoroisopropanol-substituted norbornene.

Claim 2 of the present invention reads:

A copolymer obtained by using a thiol compound represented by the formula (1);

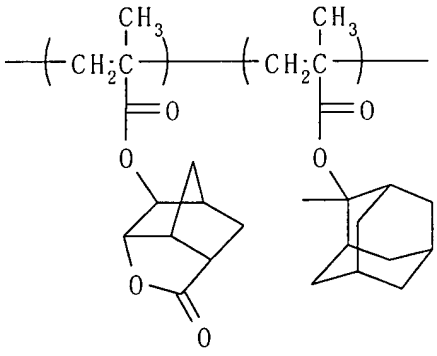


(1)

(wherein R^1 is a bivalent substituent selected from linear, branched or cyclic saturated hydrocarbon having 1 to 15 carbon atoms.) as a chain transfer agent, in polymerization of two or more polymerizable compounds having an ethylenic double bond.

The thiol compound represented by the formula (1) is used as a chain transer agent and, accordingly, the structure of $-SR^1C(CF_3)_2OH$ is introduced only to the terminal of the resultant polymer. This is common knowledge to one skilled in the art.

Example 2 is related to the production of copolymer 1 represented by the following structural formula:



and this copolymer 1 contains the $-SC_3H_6(CF_3)_2OH$ group as the end group, not the pendant group.

The position enunciated by the Examiner is based only on the structural similarity of $-SR^1C(CF_3)_2OH$ that is the end group of the polymer produced by the method (i.e., chain transfer polymerization) as claimed in Claim 2, and of $-XCH_2C(Rf)(Rf')OH$ that is the pendant group of the polymer produced by the method as disclosed in Petrov et al, U.S. Patent 6,653,419. Consequently, a comparison between the polymers clearly shows that they are completely different from each other and produced by completely different methods.

In addition, Petrov is completely silent as to the object and problems to be solved by the present invention which reads "to provide a novel copolymer which has the high adhesion and is suitable as a polymer for coating film having durability against pattern collapse in the finer pattern formation and a method for producing the copolymer, as well as a novel thiol compound useful as a chain transfer agent in the production of copolymers." (Page 7, lines 2-8). Furthermore, Petrov discloses the use of produced copolymer for F_2 laser photoresist (157 nm) only in the Abstract. However, there is no description or examples in the specification. Finally, Petrov is also silent as to the use of the copolymer for ArF laser photoresist (193 nm) as